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# ENCAPSULATION COMPOSITIONS AND PROCESSES FOR PREPARING THE SAME

## CROSS REFERENCES TO RELATED APPLICATIONS

This application claims priority to U.S. Provisional Patent Application No. 60/458,421, filed on March 31, 2003, and U.S. Provisional Patent Application No. 60/487,930, filed on July 18, 2003, both of which are incorporated herein by reference in their entireties.

## BACKGROUND OF THE INVENTION

Field of the Invention:

The present invention relates to encapsulation compositions in which an encapsulate is encapsulated in a glassy matrix. More particularly, the present invention relates to flavor encapsulation compositions in which a flavoring agent is encapsulated in a glassy matrix. The present invention further relates to processes for preparing such compositions.

Discussion of the Background:

The encapsulation of encapsulates is an area of active research. In particular, the encapsulation of encapsulates such as medications, pesticides (including insecticides, nematocides, herbicides, fungicides, microbiocides, etc.) preservatives, vitamins and flavoring agents is desired for a number of reasons. In the case of medications and pesticides, encapsulation may be desired to achieve the controlled release of the medication or pesticide. For vitamins, encapsulation may be carried out to protect the

vitamin from air-oxidation and, thus, to extend shelf life of the vitamin. In the case of flavoring agents, the encapsulation may be carried out to place the flavoring in an easily metered form which will release the agent at a controllable event, such as the addition of water.

It is generally known to skilled practitioners in the field of flavor encapsulation that the current practical commercial processes leading to stable, dry flavors are limited in great part to spray drying and extrusion fixation. The former process requires emulsification or solubilization of the flavor in an aqueous carrier containing the encapsulation solids, followed by rapid drying in a high temperature, high velocity gas stream and collection as a low-density bulk solid.

While spray drying accounts for the majority of commercially encapsulated flavor materials, several limitations of the process are evident. Low molecular weight components of complex or natural flavor mixtures generally exhibit high vapor pressures and are usually lost or disproportionate during the process. The resultant flavor-carriers are porous and difficult to handle. In addition, deleterious chemical reactions such as oxidation can result on surfaces exposed during and after drying. The final product, a dry, free flowing powder, will release the encapsulant rapidly upon hydration whether rapid release is desired or not.

U.S. Patent No. 3,971,852 discloses the use modified starch, gums and other food polymers with low molecular weight polyhydroxy compounds and spray drying to yield a glassy matrix with encapsulated oil at a maximum of 70-80% by volume. The system forms a shell surrounding the oil flavoring but is limited to lipophilic flavoring agents.

U.S. Patent No 4,532,145 discloses a process for preparing compositions in which a volatile flavorant is fixed by spray drying from a carrier solution made up of 10-30% of